

# DOE's Vehicle Technologies Office

Technology Integration



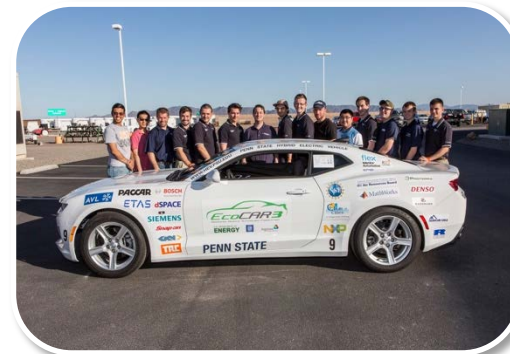
U.S. DEPARTMENT OF  
**ENERGY**

Energy Efficiency &  
Renewable Energy

**LINDA BLUESTEIN**  
CLEAN CITIES CO-DIRECTOR  
Office of Energy Efficiency and Renewable Energy

# What is Technology Integration?

- Vehicle Technologies Deployment (including Clean Cities activities)
- Advanced Vehicle Technology Competitions (EcoCAR 3)
- State and Alternative Fuel Provider Fleet program



# Funding

## Outreach, Deployment, and Analysis (ODA) Funding (\$M)

Activity	FY16 Enacted	FY17 Enacted
Vehicle Technologies Deployment	\$34	\$34
Advanced Vehicle Technology Competitions	\$2.5	\$2.5
Legislative and Rulemaking	\$1.5	\$0.9
<i>Analysis</i>	<i>\$10.4</i>	<i>\$5.1</i>
Total, ODA	\$48.4	\$42.5

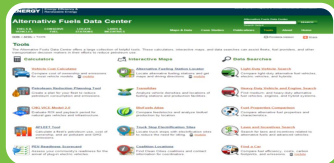


# Strategy

- Facilitate and accelerate market transformation with **visible examples, objective data, tools**, and key **lessons learned** that benefit future users



Living labs, vehicle, and infrastructure projects



Information resources, tools, and data



Expert technical assistance



Training

# Critical Success Factors

- Local and community-based coalitions/public-private partnerships
- Strong industry and end-user partnerships
- National laboratory expertise in data collection and analysis
- Close coordination with other Federal agencies and State/Regional/Local governments



# Locally-based Public-Private Partnerships

*Nearly 100 Clean Cities coalitions with thousands of stakeholders, representing ~80% of U.S. population*

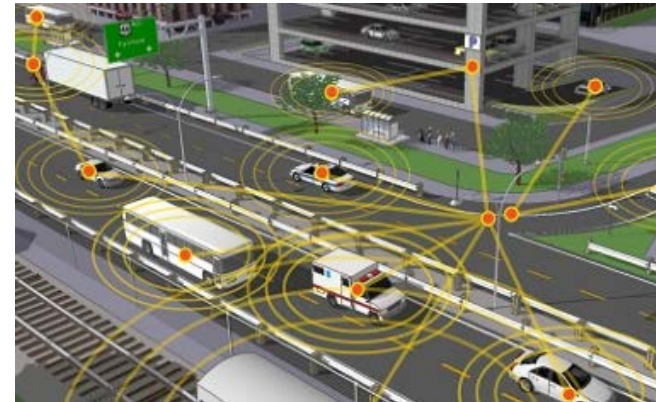
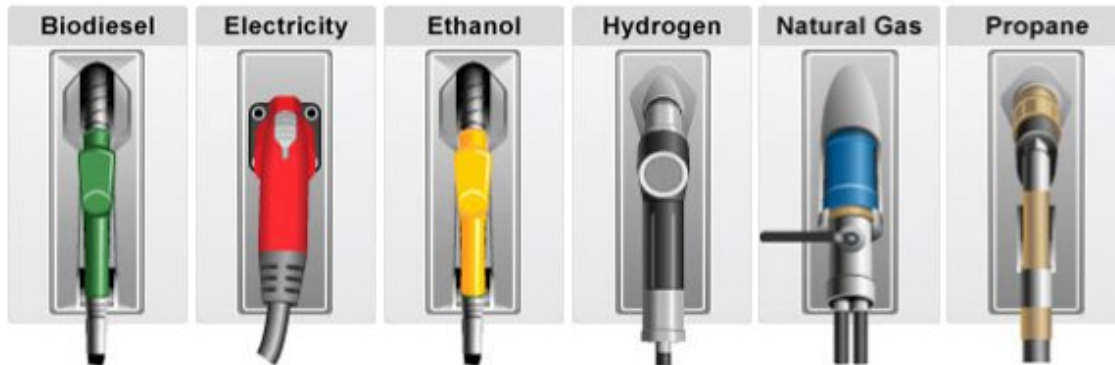


# Technical Scope

Light-, medium-, and heavy-duty vehicles



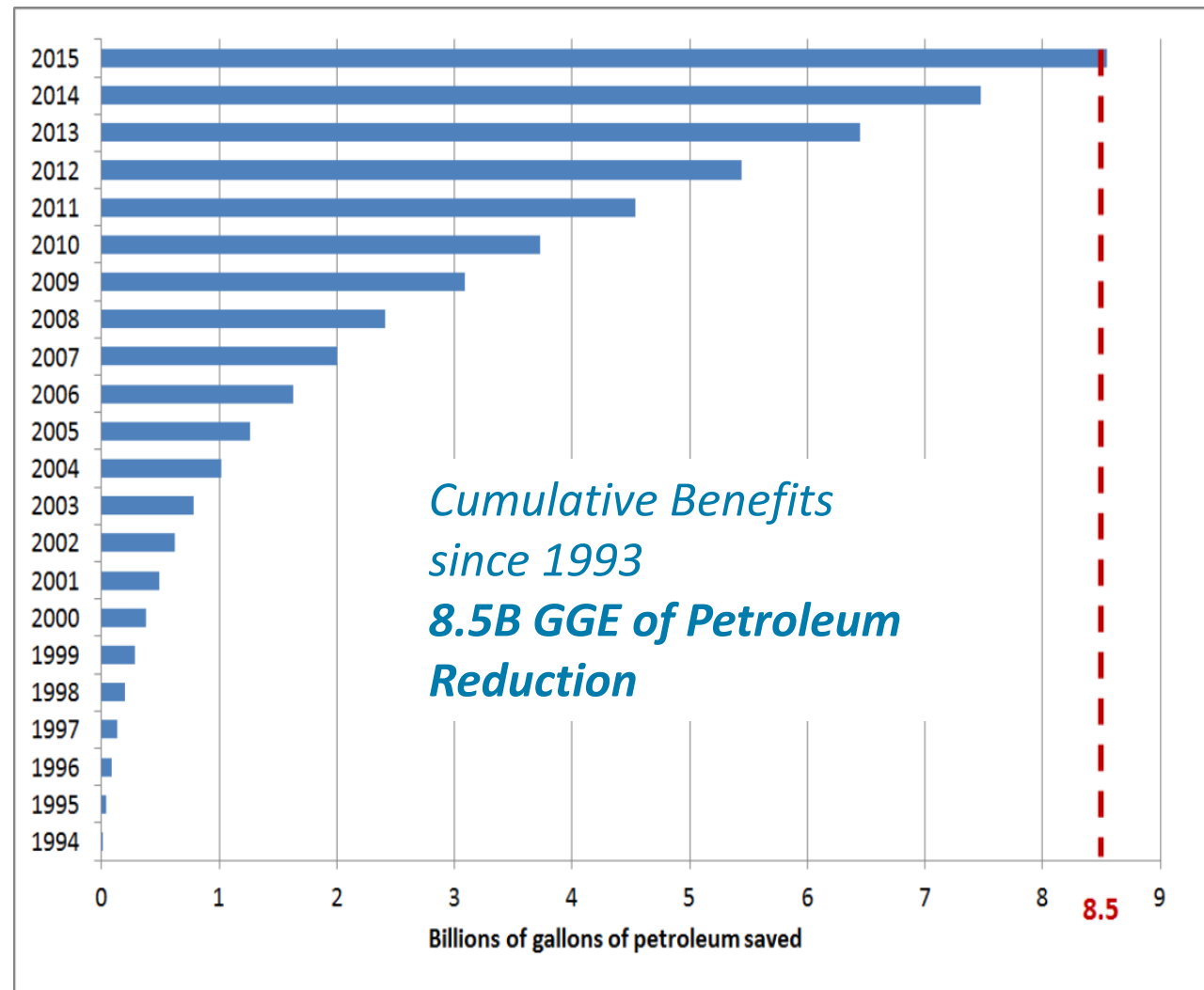
## Alternative Fuel Infrastructure



Energy Efficient  
Mobility Systems and  
Technologies

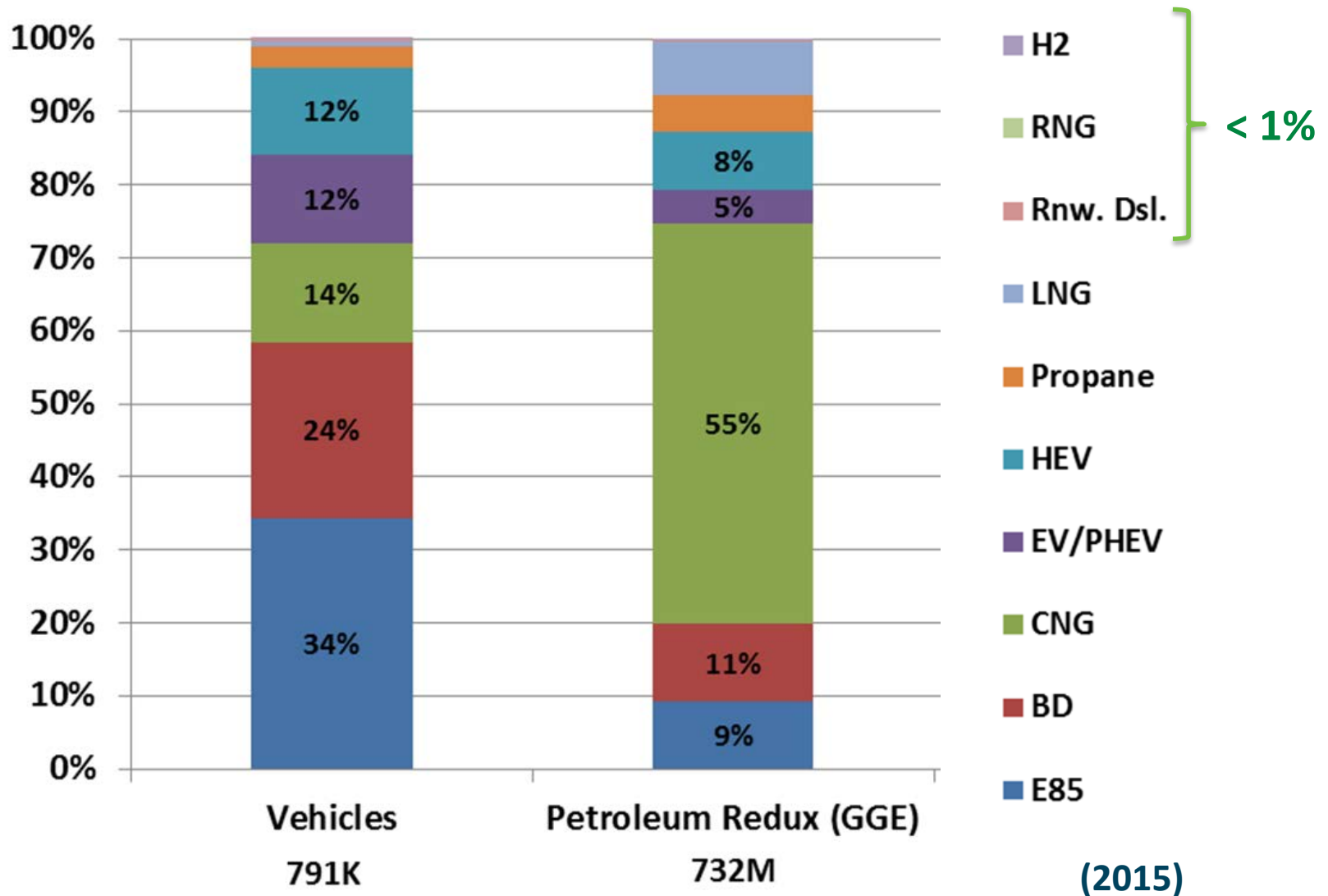
# Deployment Program Metrics

On track to meet goal of saving **2.5 billion gallons** of petroleum per year by 2020



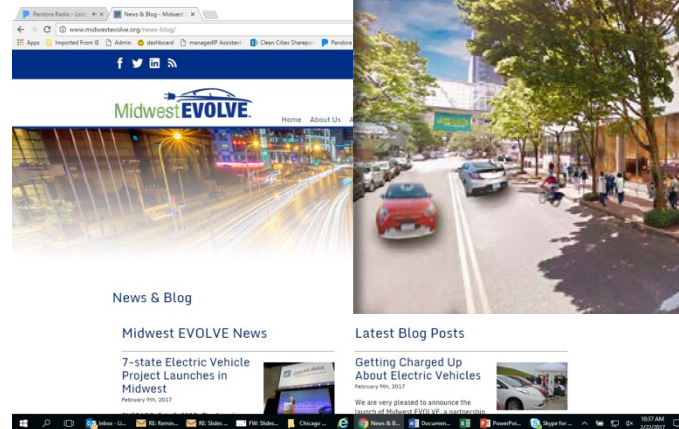


# Deployment Program Metrics



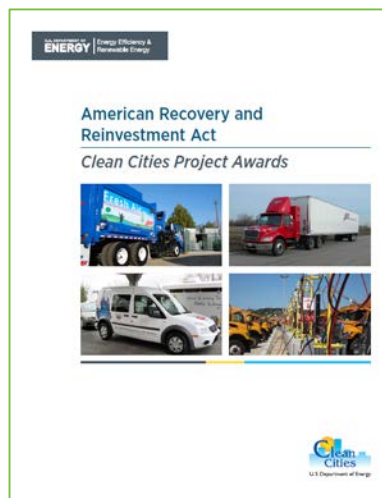
# 2016 Results & Progress: Launched Living Labs, Vehicle, & Infrastructure Projects

## Aggregated Purchasing



## PEV Showcases/ Drive Electric Orlando

## Community Partner Projects



## Project Follow-Up



## EEMS Living Lab Projects

# 2016 Results & Progress: Data, Information, and Tools

**www.fueleconomy.gov**  
the official U.S. government source for fuel economy information

**Top 1%**  
of all Federal sites

**#18**  
of 2100

**26.5M**  
views/month



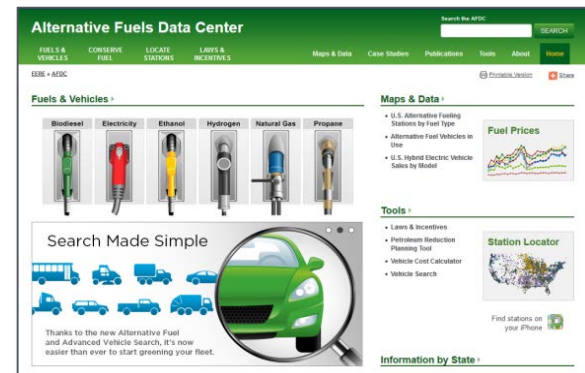
**fueleconomy.gov**

**Alternative Fuels Data Center**

**Top 13%**  
of all Federal sites

**#276**  
of 2100

**444K**  
views/month



**afdc.energy.gov**

Data based on monthly pageviews from 7/26/2016 to 8/24/2016 and compared to data gathered about Federal Sites on [analytics.usa.gov](https://analytics.usa.gov). See <https://analytics.usa.gov/#explanation> for details on how analytics.usa.gov tracks data on how people are interacting with the government online. AFDC uses Google Analytics for web traffic statistics and FuelEconomy.gov uses Urchin.

# 2016 Results & Progress: Data, Information, and Tools

## AFDC Alternative Fueling Station Locator

### Alternative Fueling Station Locator

Find alternative fueling stations near an address or ZIP code or along a route in the United States. Enter a state to see a station count or see [stations data by state](#).

Find Stations

Plan a Route

Go

Compressed Natural Gas

more search options


942


CNG stations  
in the United States

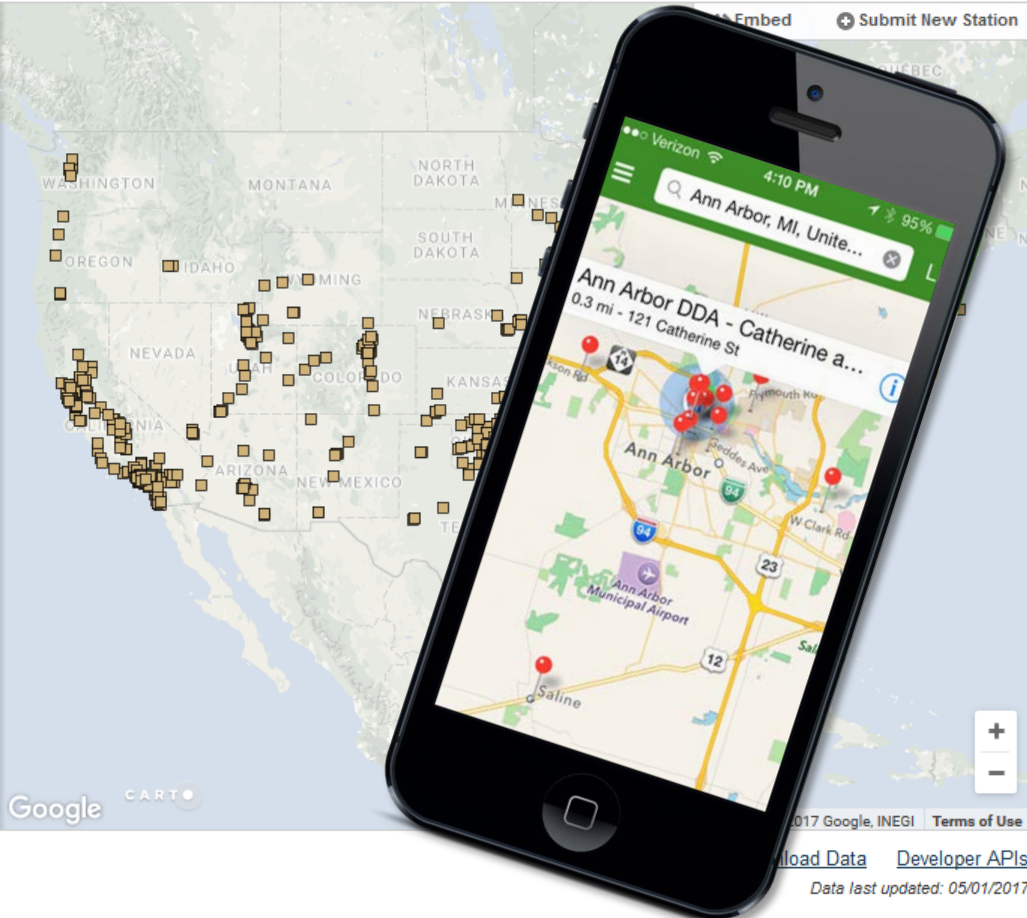
Excluding private stations

Location details are subject to change. We recommend calling the stations to verify location, hours of operation, and access.

ABOUT THE DATA

 [Go to mobile version](#)

 [Download iPhone app](#)



Ann Arbor DDA - Catherine a...  
0.3 mi - 121 Catherine St

Ann Arbor  
Ann Arbor Municipal Airport

Saline

2017 Google, INEGI Terms of Use

[Download Data](#) [Developer APIs](#)

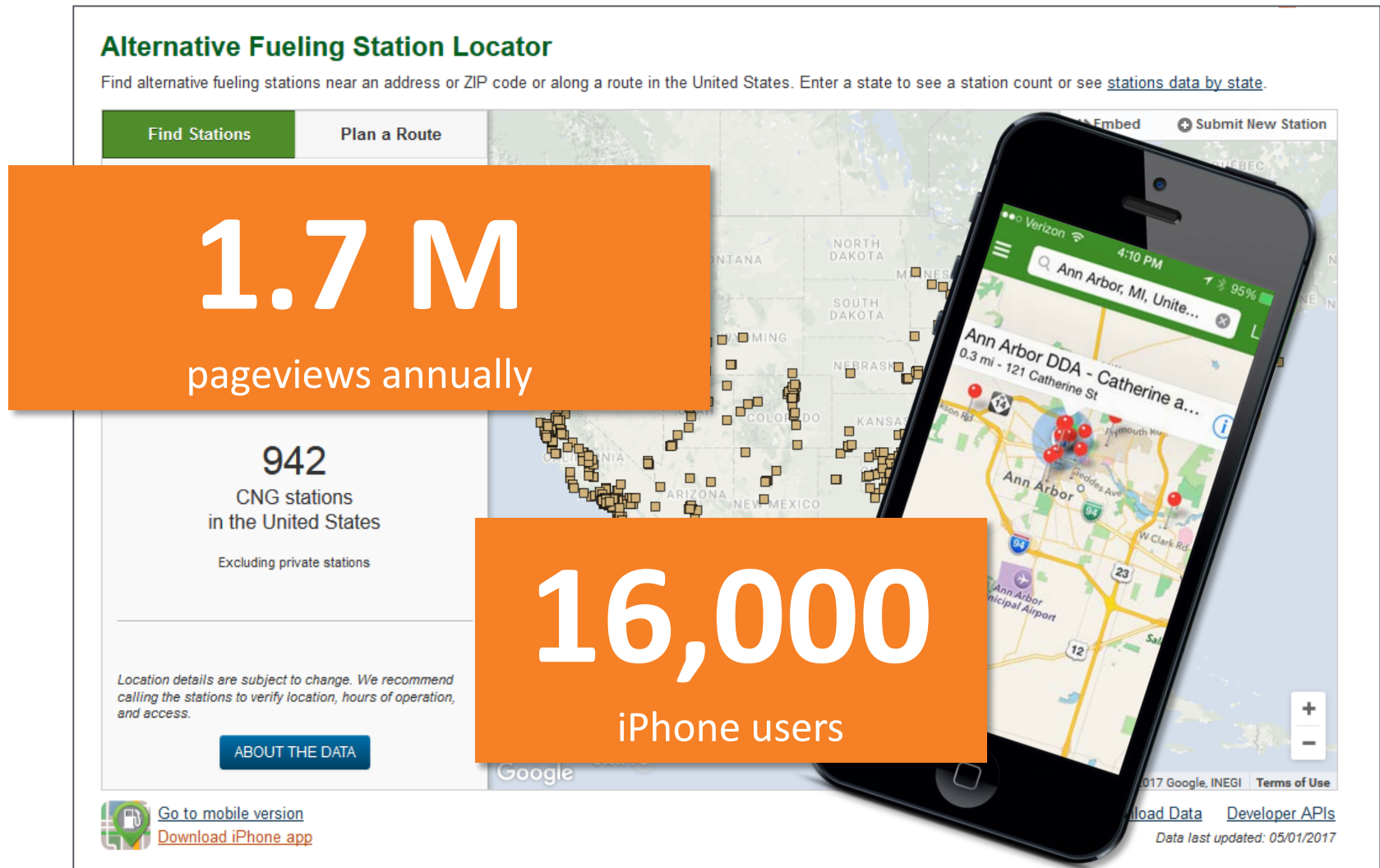
Data last updated: 05/01/2017

[afdc.energy.gov/locator/stations/](http://afdc.energy.gov/locator/stations/)



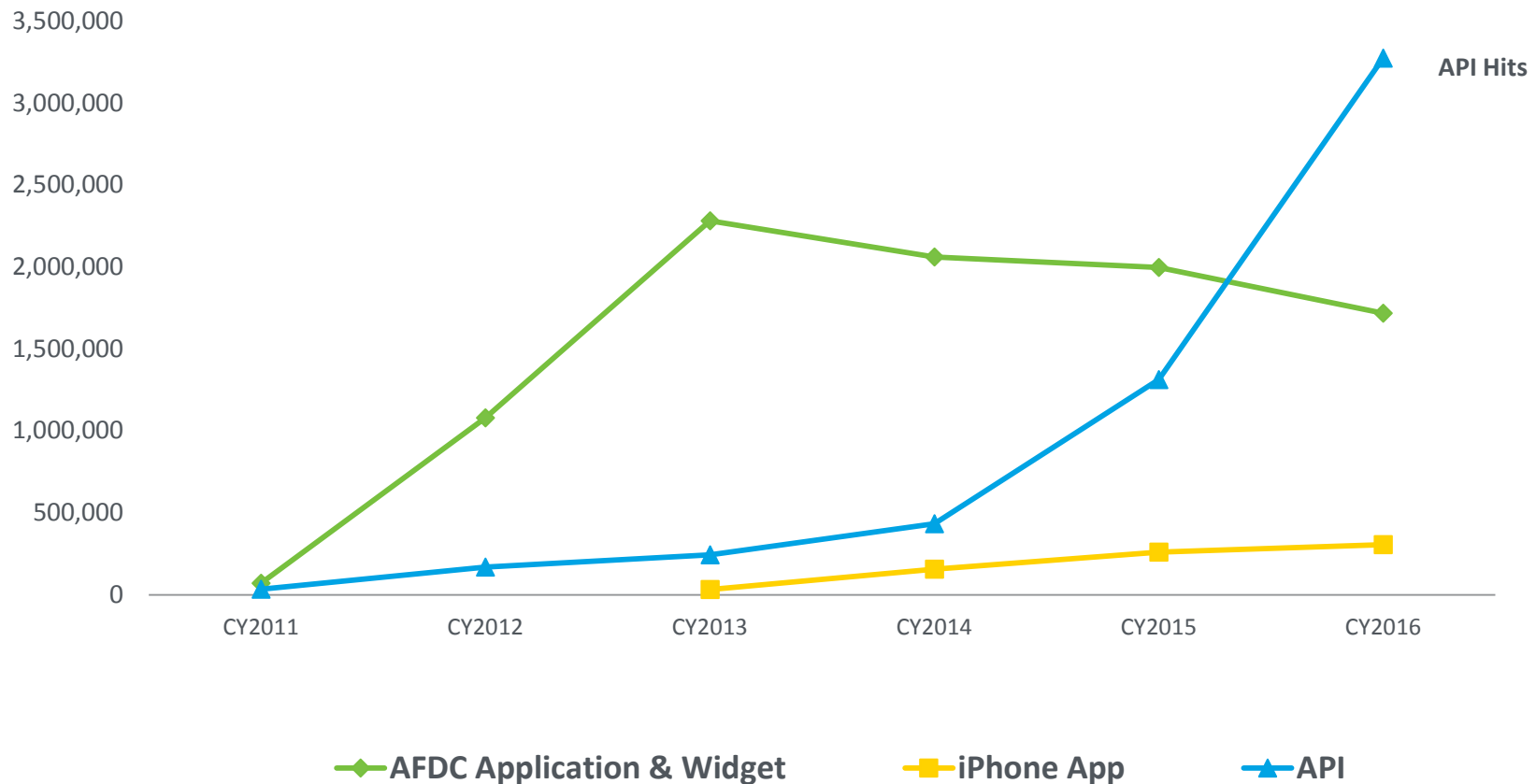
# 2016 Results & Progress: Data, Information, and Tools

## AFDC Alternative Fueling Station Locator



# 2016 Results & Progress: Data, Information, and Tools

## AFDC Station Locator Data Trends



# 2016 Results & Progress: Data, Information, and Tools

## AFDC Data Impact

### Data Downloads

#### Data Downloads

To download data related to alternative fuels and advanced vehicles, follow the steps below.

##### Step 1. Choose data to download

Choose the dataset and file format you want to download.

Dataset:

File Format:

- Alternative fuel stations
- Laws and incentives
- Truck stop electrification
- Vehicles

##### Step 2. Share your information

Provide the following contact and use information to download the data.

\* First Name  Last Name

\* E-mail Address

How will you use

\* Required fields

☐ I have read and

[DOWNLOAD](#)

The image shows the CleanFuelsOhio website. At the top is the CleanFuelsOhio logo and navigation links for Facebook, Twitter, LinkedIn, and YouTube. Below the logo is a green banner with the text "Your partner for implementing clean transportation technology in Ohio". The main navigation bar includes links for MEMBERSHIP, ALTERNATIVE FUELS, SERVICES, INITIATIVES, NEWS & EVENTS, and MIDWEST GREEN FLEETS FORUM. The ALTERNATIVE FUELS section is active, showing a search bar with "ohio" entered and a "Go" button. Below the search bar is a dropdown menu for "All Fuels" and a link for "more search options". The main content area features a map of Ohio with various colored markers representing different fuel types. A legend on the right side of the map identifies the markers: Biodiesel (red circle), CNG (blue square), Electric (green triangle), Ethanol (yellow diamond), Hydrogen (purple circle), LNG (orange circle), and Propane (pink circle). The map also shows major cities and highways.

The image shows the Toyota website for the 2017 Prius Prime. The header includes the Toyota logo and navigation links for Select Vehicle, Shopping Tools, Find a Dealer, Build & Price, and Local Specials. The main content area features a large image of a silver Toyota Prius Prime with the text "Convenient charging—fast, easy, anytime". Below the image is a search bar with the zip code "80401" and a "GO" button. The search results show a map of the area around Denver, Colorado, with various colored markers representing different fuel types. A legend on the right side of the map identifies the markers: Biodiesel (red circle), CNG (blue square), Electric (green triangle), Ethanol (yellow diamond), Hydrogen (purple circle), LNG (orange circle), and Propane (pink circle). The map also shows major cities and highways.

### APIs and Referrals

[developer.nrel.gov/docs/transportation/](https://developer.nrel.gov/docs/transportation/)

# 2016 Results & Progress: Data, Information, and Tools

## AFDC Data Impact

### Data Downloads

#### Data Downloads

To download data related to alternative fuels and advanced vehicles, follow the steps below.

#### Data Downloads

- 9,259 data set downloads
- 7,895 user downloads
- 3,700 unique users

*From Oct 2015– Dec 2016*

Your partner for implementing clean transportation technology in Ohio

#### Widgets

- 34,000 pageviews
- 300+ embeds

*Q1 2017*

#### API

- 3,470,000 data requests
- Average of 360 users per quarter

*From Oct 2015– Dec 2016*

#### Linked Referrals

- 5,000 referral links to the AFDC accounting for more than 550,000 user sessions.

*From Oct 2015– Dec 2016*

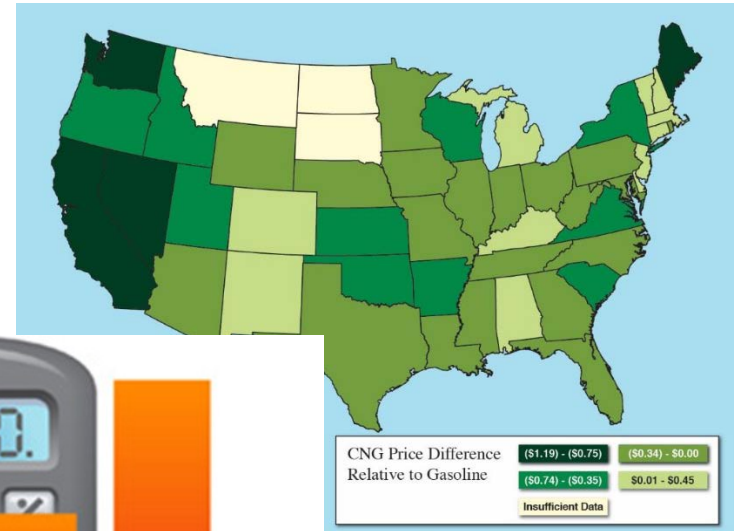
### APIs and Referrals



# 2016 Results & Progress: Data, Information, and Tools

## AFLEET Tool

- Helps fleets examine vehicle emissions and economics
- 16 fuel/ vehicle technologies (conventional, advanced technology, alternative fuels)
- Over 6,000 users
- Significant updates in 2016



# 2016 Results & Progress: Data, Information, and Tools

## Fuel Economy Information

The screenshot shows the homepage of [www.fueleconomy.gov](http://www.fueleconomy.gov). The header includes the U.S. Department of Energy logo and navigation links. The main content area is titled 'Find and Compare Cars' and features a 'Browse by Model' section with dropdown menus for Year (2017), Make, and Model. Below this is a 'Search by Class' section with dropdowns for Year (2017), Class (Small Cars), and Combined MPG (>=). A 'Browse New Cars' section displays a grid of car categories: Small Cars, Sedans, Hatchbacks, Coupes, Sporty Cars, Luxury Cars, Wagons, SUVs, Pickups, Hybrid, Plug-in Hybrid, All-Electric, Diesel, Flex-Fuel, and CNG. A green callout box with the text 'Find and Compare Cars' is overlaid on the right side of the page.

- Most popular section of website (191 million page views in model year 2016)
- MPG ratings for 38,000 vehicles over 34 model years

The screenshot shows the Fuel Economy mobile app interface. The header includes the Verizon logo, time (2:01 PM), and a menu icon. The main content area is titled '2016 Ford C-MAX Energi Plug-in Hybrid' and features a car image. Below the image, it lists '2.0 L, 4 cyl, Automatic (variable gear ratios)' and 'MSRP: \$31,770'. A comparison table shows 'Elec + Gas' with 88 MPGe and 'Reg. Gas' with 38 MPG. A bar chart shows the 'Gasoline Only' range (20 miles) and 'Total Range' (550 miles). The 'Annual Fuel Cost\*' is listed as 'Electricity + Gasoline: \$850'. A green callout box with the text 'Mobile App' is overlaid on the right side of the page.

- 18,800 installations as of March 2017
- Highly rated in app stores (>4 out of 5)

# 2016 Results & Progress: Expert Technical Assistance



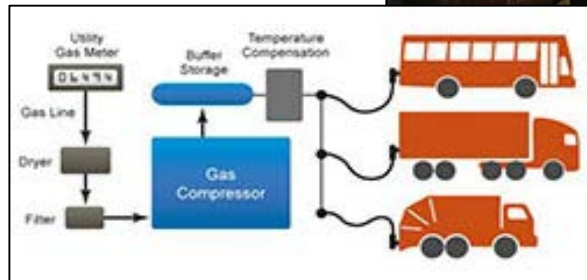
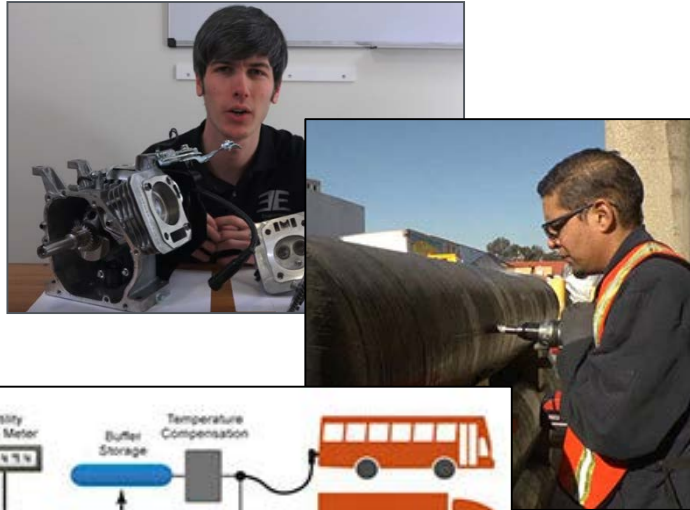
## Technical and Problem Solving Assistance

- Capture lessons learned and best practices
- Technical Forums and User Groups
- Address unforeseen permitting & safety issues
- Identify chronic vehicle or infrastructure field problems
- Incident investigations

## Technologist in Cities

- Embedded technical expert – unique expertise to assist city/community leaders
- Connects to SMART Mobility – coordination for mutual benefit of DOT Smart City Challenge/EERE SMART Mobility consortium

# 2016 Results & Progress: Training (Clean Cities)



**Clean Cities University**

**Training for First Responders**

NFPA training available at [www.evsafetytraining.org](http://www.evsafetytraining.org)



**AFV Workplace Safety Training**





# 2016 Results & Progress: Training (EcoCAR 3)

## Advanced Vehicle Technology Competitions

*Developing the scientists and engineers to address our energy needs.*

- More than 16,500 students have participated
- 93 North American universities have participated since 1989.
- 83% of AVTC graduates have entered the automotive industry.
- 69 patent applications submitted by AVTC graduates.



Senator Albert Gore, Jr. (D-TN) congratulates Cameron Sumner of the University of Tennessee. Tennessee came in first place in the GM/SAX Methanol Marathon with a cumulative score of 764 points. The 1,100-mile, five-day rally came to a conclusion on Capitol Hill on May 4.

General Motors Public Relations (202)775-5040



# 2016 Results & Progress: Training (EcoCAR 3)



- 4 year competition (2014 – 2018).
- Based on a real-world vehicle design process.
- DOE is teaming with General Motors and more than 30 other government and industry leaders.

## 16 North American Universities

Arizona State University  
California State University – LA  
Colorado State University  
Embry-Riddle Aeronautical University  
Georgia Institute of Technology  
McMaster University  
Mississippi State University  
Ohio State University  
Pennsylvania State University  
University of Tennessee, Knoxville  
University of Alabama  
University of Washington  
University of Waterloo  
Virginia Tech  
Wayne State University  
West Virginia University

# 2016 Results & Progress: Training (EcoCAR 3)

## Year 3 Competition: Milford, MI and Washington, DC

Vehicles put to the test at  
Milford Proving Ground



*And the **Winner** is.....*

# Wrapping Up...

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- Comprehensive deployment program
- New mobility effort established and growing
  - Technologist in cities
  - Living labs
- Tools/data continue to be improved and expanded – serve as backbone for many third-party activities and help end users understand costs and efficiency
- Technical assistance helps fleets, manufacturers and infrastructure providers find solutions and provide critical feedback to inform product development and researchers.
- Strong network of local Clean Cities coalitions, partnerships with other federal agencies, major fleets and industry partners and other stakeholders essential for success



# Technology Integration Contacts

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